



DECLARATION UNDER 37 C.F.R. § 1.131

#6  
Declared  
5/20/03  
alg

Commissioner for Patents  
Alexandria, VA 22313-1450

Sir:

I, Stephen Gregory Shermer declare as follows:

1. I am an Applicant for the patent application entitled "PLACEMENT TEMPLATE AND METHOD FOR PLACING OPTICAL DIES", Ser. No. 09/943,068, filed August 29, 2001, and a co-inventor of the subject matter described and claimed therein.

2. Prior to June 11, 2001, the subject invention was conceived of and diligently pursued until it was reduced to practice, in the United States of America, as evidenced by the following:

(a) Prior to June 11, 2001 my co-inventor and I had conceived of the invention as documented in a presentation paper we prepared for an in-house presentation. The presentation is attached hereto as Exhibit A, which shows that the subject invention was conceived of before June 11, 2001.


b) Subsequent to June 11, 2001, my co-inventors and I diligently pursued preparation and filing of the present patent application, which was filed on August 29, 2001.

3. The date deleted from Exhibit A is prior to June 11, 2001.

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4. I further declare that all statements made herein of my own knowledge and all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful and false statements and the like so made are punishable by fine or imprisonment or both under § 1001 of Title 18 of United States Code and that such willful and false statements may jeopardize the validity of the above-referenced application and any patent issuing therefrom.

FURTHER DECLARANT SAYETH NOT.

Stephen Gregory Shermer  Date: 5/5/03

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APPENDIX A

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## Tiled die attach using template

### ◆ Problem

- attaching a large single die (> 50mm x 50mm) for optoelectronic MEMS applications poses problems related to the size of the die, the difficulty associated with handling MEMS die, and the precision to which it must be placed on a substrate.
- replace single large die with smaller die, which when aligned correctly (tiled), produce the same net result as the single die, but without the inherent assembly problems



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## Tiled die attach using template

### ◆ Solution

- Tile the smaller die using a high-precision silicon template which is first attached with high precision to the package substrate and aligned. This template is electrically and optically inactive, so there are few constraints to handling it. The individual die are attached to the substrate, and use the template for precise positioning and alignment. Preferred method of attaching template to substrate would likely be eutectic attach.



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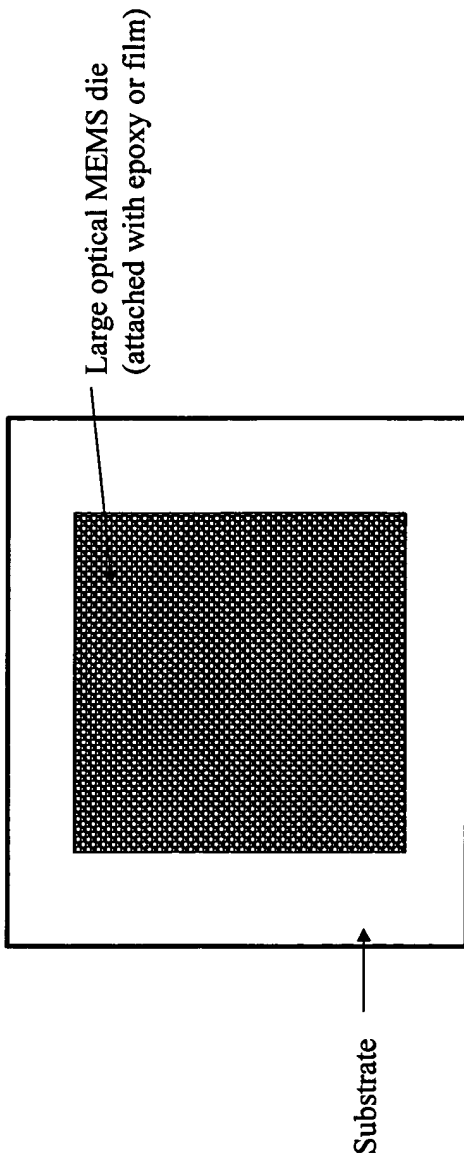
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# Tiled die attach using template Current single die method

Top view



Placement accuracy = +/- 10 um



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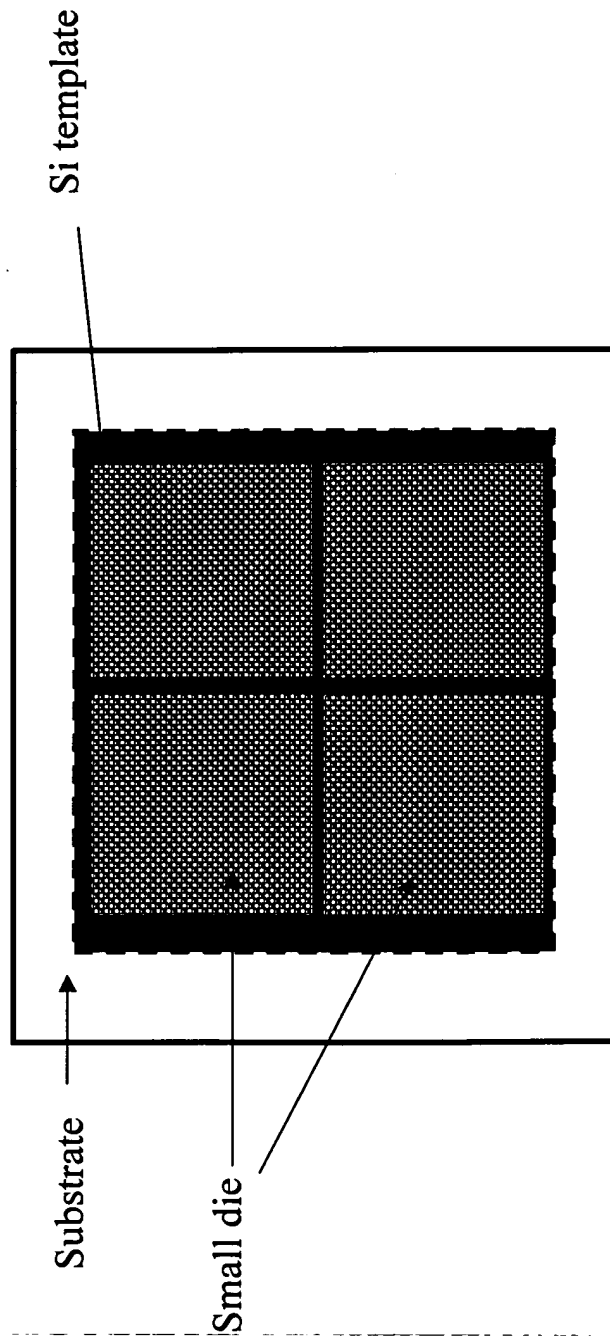
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# Tiled die attach using template

## Proposed method

Top view



Placement accuracy =  $\pm 2 \mu\text{m}$



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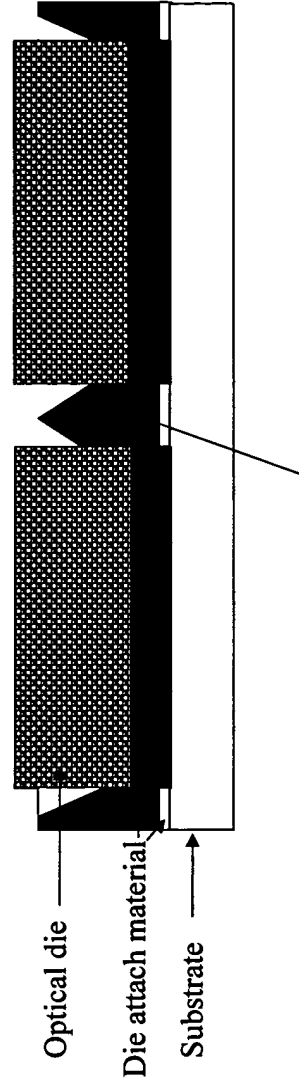
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# Tiled die attach using template Proposed method

Side View



Silicon template aligns and positions small separate optical die. Template is notched at top to allow optical die to self-align during placement.



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